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ABSTRACT

Extensive longitudinal data were gathered on a child's entry into the symbolically mediated modal world by examining changes in the semantics and pragmatics of her uses of modal auxiliary verbs. The data are 53 transcripts of natural conversations between a girl, Nina, and her mother recorded periodically from her 23rd month to her 39th month. The focus is on 1,826 modal expressions she produced. The three major analyses used were a semantic analysis, conversational act analysis to ask what she is doing when she uses a modal, and a third analysis to ascertain what worlds her modal utterances referred to. The modalities fall into three categories: (1) the dynamic, or logic of factual conditions for action; (2) the deontic, or the normative conditions; and (3) the epistemic, or logic of knowledge or belief claims. Nina's first modals were produced at age 2 years, 2 months. Her overall modal production increased in each of the 4-month periods, along with a steady increase in the number of different forms. The overall analysis shows that Nina used modals more frequently to initiate than to respond to turns of talk. By her use of modals, she formulates and communicates plans, structures and enriches the world of pretend play she creates, and coordinates and shares her meaningful actions with others. (AMH)

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World-Making and World-Revealing: Semantics and Pragmatics of Modal Auxiliary Verbs During the Third Year of Life

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Paper presented at the Seventh Annual Boston University Conference on Child Language Development, October 8-10, 1982. This research was supported in part by Biomedical Grant No. C-7-07717702 awarded to the first author. We would also like to express great appreciation to Professor Patrick Suppes of Stanford University for allowing us to glimpse into the richness of the Nina corpus.

The importance of modals for language structure and function has often been stressed by logicians and linguists. The modals, terms such as "can", "must", and "will", lexicalize such pervasive concepts as possibility, necessity, intention, and prediction. These concepts play particularly prominent roles in the domain of practical activity, where our planning makes use of instrumental possibilities, and is constrained by instrumental necessities. They are central to the domains of morality, of law, and of social convention; more generally, wherever we think of obligation and permission. Modals are also integral to the epistemic domain, in which we reflect upon our thoughts and consider warrants for our beliefs, as in the case of science. And modal concepts are used to distinguish the various phenomenal worlds in which we live -- we distinguish the 'real' world from the 'merely possible' worlds of fantasy, play, and art. The acquisition of the linguistic vehicles for such "ecologically relevant" notions as possibility, necessity, intention and prediction thus represent important developments for cognition and socialization. In our present study, we report the first extensive longitudinal data on a child's entry into the symbolically mediated modal world by examining changes in the semantics and pragmatics of her uses of modal auxiliary verbs.

The data are computer transcripts of natural conversations between a girl, Nina, and her mother (and other persons), recorded in the home environment. There are 53 sessions, recorded periodically from Nina's 23rd month (MLU 1.73) to her 39th month (MLU 5.06) of age. Of the over 100,000 words Nina spoke in this corpus, our focus will be on the 1826 modal expressions she produced. The modals included were CAN, COULD, WILL, WOULD, SHALL, SHOULD, MAY, MIGHT, MUST, NEED, OUGHT TO, HAD

BETTER, HAVE (GOT) TO, SUPPOSED TO, and GOING TO, as well as their contracted and negative counterparts. For analytic purposes, we divided the 16 months of transcripts into 4 four-month periods (designated as I, II, III, IV).

We carried out three major analyses. First, we developed a semantic analytic system from extensive surveys of the logicolinguistic literature, in order to ask what Nina means when she uses a modal. Second, we used the conversational act analysis of Dore, Gearhart & Newman (1978) to ask what Nina is doing when she uses a modal. Third, we asked what worlds Nina's modal utterances refer to. This scene analysis distinguished three scenes of reference for Nina's modal talk: the literal world of everyday life; the pretend play worlds Nina often created; and the representational world of books and pictures. The results can, of course, only be sketched in the time available. We will devote most of our talk to the semantic analyses.

Our modal semantic system distinguishes three principle modalities[1]: the Dynamic, the Deontic, and the Epistemic. The Dynamic modality concerns the logic of factual conditions for action. This modality includes statements of personal abilities to accomplish acts, of the capacities of objects considered as instruments, and of the means required to attain given goals. Examples from the Nina corpus include "You could fix it", "I can't say the words", "I need that blanket", and "We have to go in our car, there".

The Deontic modality concerns normative conditions for action. Here we include expressions of obligations and permissions following from moral, legal, or conventional norms. Examples of Deontic modal

senses are "You have to be quiet", "You could eat my gum", and "Can Samantha come and play?"

The Epistemic modality concerns the logic of knowledge or belief claims, such as whether or not some event is possible or necessary, given inferences from factual knowledge. Examples are "That must be the Daddy" and "You may want to."

Within each of the three modalities, we distinguish three modal degrees, namely, possibility, necessity, and a null degree. There are also negative forms corresponding to the nine resulting categories.

The need for a null-degree category arises because for each modality there is an important class of cases that definitely do not take a possibility or necessity marker. For the Dynamic modality these cases are statements of intention, since they are factual conditions for action. Examples of such intentional statements are "I will try to put a bottle in his mouth" and "I'm gonna hide in here so you can't get me". For the Deontic modality, there is the "so be it" case of fiats, which establish facts, role-identities, abilities, and norms in pretend play. Instances of fiats include "This doll is gonna be the nurse" and "This train is gonna go to San Francisco". In the Epistemic modality there are cases of predictions, in which factual knowledge is used to derive inferences, but not marked in terms of its possibility or necessity. Examples include "The lady gonna fall down" and "Santa Claus gonna give me some candy...tomorrow."

First, some distributional facts about the corpus. Nina first produced modals in this corpus in the 10th of the 53 sessions, when she was two years and two months old, and the session MLU was 2.54. Thereafter she produced modals in every session. Her overall modal

production increased in each of the 4 four-month periods (Table 1). In Period III (2;8 to 2;11, MLU 3.64) Nina's modal production doubled. This is not due simply to a general increase in the amount of Nina's talk, since the modal percentage of Nina's total words produced doubled, from 1.6% to 3.1%. There was a steady increase in the number of different forms used. Positive and negative forms entered production together. Past tense forms (COULD, WOULD, SHOULD) entered production in Period III.

The scene analysis (Table 2) shows that slightly over half of Nina's modals referred to the literal scene, while 45% referred to the pretend play scene. The increase in modal production noted between Periods II and III is largely due to an increase in the number of words referring to pretend play. Two-thirds of the modals referring to pretend play were fiats, used to structure the play scene. This finding reveals the importance of modal language in the creation of pretend play worlds.

Nina most often used the forms of BE GOING TO (going to, gonna) and WILL (will, would, won't wouldn't). These tokens comprise two-thirds of the total of 1826 tokens. They are always in the null-degree senses, to announce intentions, make predictions, or perform fiats. Most of the rest of the tokens are forms of CAN (can, can't, could, couldn't), HAVE (GOT) TO (have to, gotta) and NEED. The forms of CAN are used to express Dynamic as well as Deontic possibility. The forms of HAVE (GOT) TO and NEED are used to express both Dynamic and Deontic necessity.

The semantic analysis (Table 3) shows that Dynamic senses predominate, especially in the first two periods. In the later periods, the Deontic fiats in pretend play become most frequent. This pattern is

consistent with the general finding that early child language is rooted in present, ongoing action (e.g. Bruner, 1982; Snyder, Bates & Bretherton, 1981; Werner & Kaplan, 1963). The Epistemic null-degree modals of prediction increased steadily throughout the four periods. There were almost no Epistemic possibility or necessity senses found.

In the Dynamic modality, there are about as many statements of intention as of instrumental possibility and necessity. Intentionality is not introduced by language, of course, but the linguistic vehicle for intentional expressions aids Nina in several critical ways. Once she can fix and isolate her goals through language, she becomes less stimulus-bound and impulse-driven. Her ability to plan her actions and to sustain longer sequences of action is thus improved. Further, the ability to announce intentions and speak of instrumental relations is crucial for engaging in joint activities. In the early sessions Nina appears to be the bearer of impulses, while her mother tries to follow Nina's activities as best she can. By the later sessions, Nina is explaining what she is going to do, as well as why she is doing it. Moreover, Nina begins to use modals to negotiate joint play, as when she asks the deliberative question, "What should we do now?" Such talk makes Nina's context of activity explicit, so that her mother can gain insight into her understanding of events.

In the first two periods there are more expressions of Dynamic necessity than of possibility. The ratio is reversed in the later two periods, as possibility statements outnumber necessity statements. Moreover, the logical subjects of most of the Dynamic utterances are persons rather than objects. Before Period III, Nina does not remark on the instrumental capacities of objects. She refers only to the needs

and capacities of persons. Her modal talk thus reveals the subject-centered, instrumental-action focus of her relations to objects during this early period.

Expressions of the concepts of possibility and necessity in the Deontic modality, that is, through the senses of permission and obligation, are found with increasing frequency throughout the four periods. The early senses are mostly obligation, the later senses mostly permission, once again revealing the ontogenetic primacy of necessity over possibility. These are predicated both of self and other. These Deontic expressions show Nina's grasp of the normative constraints on action. She uses them to control her own actions, as in "I have to be careful". She shows herself to be an agent who can issue rights, as in uttering the permission-granting "Come on you can play with us." She reveals an awareness of the duties of her social station, in such statements as "The children have to do what the mommy says." The modal linguistic vehicle is central here for the negotiation of rights and duties, a fundamental aspect of communicative discourse (Kress & Hodge, 1979; Labov & Fanshel, 1977).

The Deontic fiats are used throughout, especially often in Periods III and IV. These fiats of pretend play constitute the single most frequently used modal sense in the entire corpus. As play materials go from conventional replica toys, which share perceptual features with what they represent, to ambiguous or imaginary objects, the functional meaning of the play object is increasingly drawn from linguistic fiats. When joint play occurs, its shared meaning is given by the fiat. This fiat, of course, is then open to negotiation and revision. Linguistic formulation has the additional benefit of enabling Nina to objectify her

social roles, making her patterns of action into objects of contemplation and transformation. In general our talk reveals the nature of our thought and persona. When Nina's talk creates social obligations and permissions in pretend play, she objectifies, for herself, the social roles in which she participates.

Now to the data on fiats. We distinguish two types of fiats, simple and embedded. Simple fiats create simple facts in pretend play, such as "This is gonna be the mommy". In contrast, embedded fiats create modal facts, as in "The mommy has to go to work" or "The children have to do what the Mommy says". Embedded fiats enrich play by modal world-making. These fiats explicitly introduce imaginary obligations, permissions, abilities, and inabilities. In Periods I and II, there were no embedded fiats. By Period IV, one-third of the fiats were embedded. After embedded fiats emerge, Nina gives herself a dual identity: as director and as character within her play. It appears likely that embedded fiats create pretend play worlds as independent and stable enough entities for Nina to adopt such a dual agent role. This sort of embedding of a modal fiat within an implicit or explicit simple fiat indicates the complex logical and cognitive structure of pretend play. It is paralleled by the stacking of pretense upon pretense, as in the case where Nina pretends she has playdough to serve as the pretend food to her toy animals. When worlds within worlds are created by speech (Cassirer, 1955 and Goodman, 1975 have provided fascinating discussions of such "world-making"), if the referent of the speech becomes unclear, the boundaries between worlds become blurred. On one occasion Nina and Mom were playing with dolls which they took to represent Nina and Mom. They pretend to take the dolls to a movie

theater. Nina invents a movie plot which includes a fire. And here the discourse becomes hard to follow (not only for the investigator, but for Nina and Mom), because we are unsure which world it is that is threatened by the flames. In the literal scene we have a pretend scene which represents it; the pretend scene further contains a representational (movie) scene. The differentiation and integration of scenes such as these is a notable cognitive achievement, one worthy of future investigation.

To return to our semantic analysis, we note that the Epistemic modals are nearly all used in the null-degree sense of prediction. The logical subjects of Nina's predictions vary greatly. They include objects, events, actions, and responses of other persons, and even non-intentional self-predictions, as when asked how she would like to be boiled in a pot, Nina replies: "That wouldn't be much fun." There is a conspicuous absence of Epistemic modals referring to the warrant for Nina's beliefs. Sometimes Nina does qualify her assertions after her confident predictions are questioned by mother, although she rarely uses modals to do so. One example of such qualification is the propositional attitude construction "I think it will fit." Here the modal WILL simply predicts; the "I think" marks the qualification. It may be that doubt is the primal source of qualified assertion, and that doubt initially arises when after asserting confidently, one is contradicted by another. This would entail that predictive conversational uses would be prerequisites for Epistemic senses of possibility and necessity.

Now to our pragmatic analysis of her modals. By providing an account of what kinds of conversational actions Nina is carrying out with her modals, we can supplement the semantic analysis and see more

clearly the functional role of modals in Nina's lifespace. We have used the system for classifying conversational acts developed by Dore and colleagues, which specifies six general classes of such discourse acts. Four of the general classes convey content: requestives, assertives, performatives and responsives. Requestives solicit action or information. Assertives initiate turns of talk by stating facts, asserting rules, announcing intentions, making explanations, and so on. Performatives accomplish acts and establish facts by being said. Responsives supply solicited information or acknowledge prior remarks. The two other general conversational classes are regulatives, which control personal contact and conversational flow, and expressives, which non-propositionally convey attitudes or repeat utterances.

The overall pragmatic analysis (Table 4) tells us that Nina uses modals much more frequently to initiate -- through her requestives, assertives, and performatives -- than to respond to turns of talk (1193 versus 477). We will first discuss these initiations.

Requestives for Periods I and II were for action rather than information; information requestives became prevalent in the final sessions. The form of her requests changes markedly over the 16 month interval. Early requests are grammatically declarative and simple statements of need. If no response is forthcoming, Nina just repeats her statement. Such early repetitions for requests are of course well-documented (e.g. Keenan, 1977). Later she develops a polished routine for requests that is explicitly requestive and more effective, using WILL or WOULD, as in "Would you open this?"

Assertives are mainly internal reports, announcing intentions to act, but Nina also predicts, gives reasons and causes for events,

asserts rules, and makes attributions to others. By stating her intentions, Nina makes public the meaning that her action has for her, thus facilitating appropriate responses. Social interaction is the interaction of personal agents, so one must have some means to manifest one's person. Since the early sense of self involves both personal capacities and physical characteristics, talk of intentions and abilities reveals the self to others. Intentional uses of modals are thus at once identity-building and identity-displaying. On another front, the explanations Nina gives reveal to others the relational fabric of her knowledge. They show her plans relating means to goals, as in "she have to eat Jello so she could get well and go to school" and "We're gonna put them (pills) way up high...so the babies can't get them". Explanations also show her beginning to relate actions to norms, as in "You can't have it 'cause you're a bad boy." Finally, we observe that Nina's increased ability during the two final periods to organize her play with performative fiats sustains her play sequences, bringing a continuity of topic to her discourse.

Notice that by including both semantic and pragmatic analyses we are able to trace out some important reciprocal influences of language in intra- and inter-psychic development. We see the spiraling influences of linguistic formulation of thought and linguistic communication in social exchanges. As the linguistic vehicles for modal meanings allow Nina's domain of action to increase in scope, it also allows those actions to be meaningfully shared. Thus Nina is enabled to establish and maintain richer personal contacts with her mother. In many ways, then, the intersection of semantic and pragmatic analyses

shows Nina operating in an increasingly rich, and increasingly shared, set of contexts.

Let me quickly summarize our results. Most of Nina's modal talk is rooted in ongoing action, with little spatio-temporal distance between the frame of utterance and the frame of reference. She speaks of intentions, and the capacities and requirements related to those intentions. Thus she formulates, communicates, and negotiates plans and joint activities. She uses fiats to structure the worlds of pretend play she creates. The fiats allow stable and shared meanings for pretend play objects, even when the objects do not share perceptual features with what they represent. Embedded fiats enrich pretend play worlds further through the introduction of modal facts. Predictions reveal the relational fabric of Nina's knowledge and her developing expectancies about the specific nature of the future, and may be prerequisite for reflection upon the warrant for belief statements. In general, modal language allows for an increase in the scope and richness of Nina's meaningful actions, and permits her to coordinate and share these actions with others.

As self-reflective agents guided by social and moral norms, living in multiple worlds over and above the literal world, modality pervades our lives. Thus the study of modals provides an unrivalled point of vantage from which to view the development of children, as they reveal their thoughts about our socially-constituted world, and engage in their own world-making.

Footnotes

[1] A fourth modality, the alethic, has been distinguished in the logicolinguistic literature (e.g. Lyons, 1977), and concerns logical rather than factual truth. For example, "It has to be the case that it is either raining or not raining." In this corpus, as well as an earlier semantic study of modals used by a group of nursery school children (Pea & Mawby, 1981), we found no instances of modal productions that conveyed the alethic modality, and it is not included for purposes of our current analyses.

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Table 1
Number of Modal Tokens and Forms for Each Period

Period	Sessions	Nina's Age (Year: Month	Mean MLU	Number Of Modal Tokens	Mean Modal Tokens Per Session	Mean Percent Of Modal Tokens	No. of Different Modal Forms Used
I	1-17	1:11-2:4	2.59	107	13	.95	11
II	18-28	2:4-2:8	3.38	219	20	1.67	16
III	29-38	2:8-2: 11	3.64	504	50	3.12	23
IV	39-53	2:11-3:4	4.18	996	66	4.00	27

Table 2

Referential Scene: Number of Tokens

	I	II	III	IV	Total
Literal Scene	53	144	235	494	926
Pretend Play	54	62	240	478	834
Representation (book/picture)	0	13	29	24	66

Table 3

Semantic Analysis: Number of Tokens

	I	II	III	IV	Total
Dynamic Null (intentions)	21	73	73	168	335
Dynamic Necessity and Possibility	38	42	86	229	395
Deontic Null (fiats)	18	38	183	344	583
Deontic Necessity and Possibility	8	7	28	45	87
Epistemic Null (prediction)	17	51	111	180	359
Epistemic Necessity and Possibility	1	1	2	3	7

Table 4
Conversational Act Analysis: Number of Tokens

	I	II	III	IV	Total
Requestive	11	21	88	151	271
Assertive	51	106	118	288	563
Performative	7	24	85	243	359
Responsive	27	42	161	247	477
Regulative	0	0	0	1	1
Expressive	6	19	30	38	93